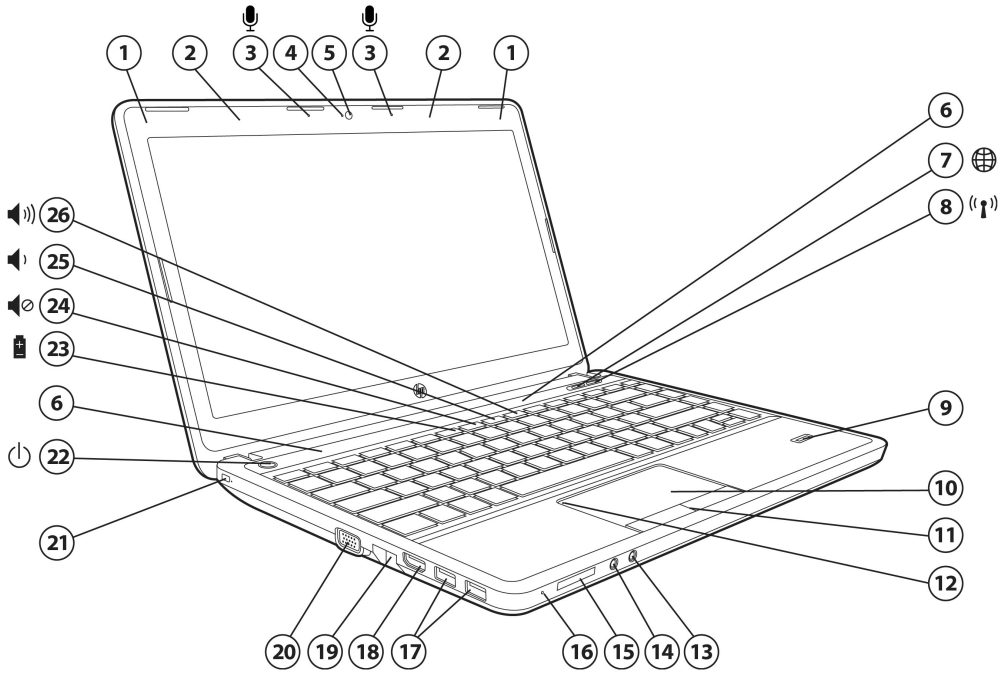
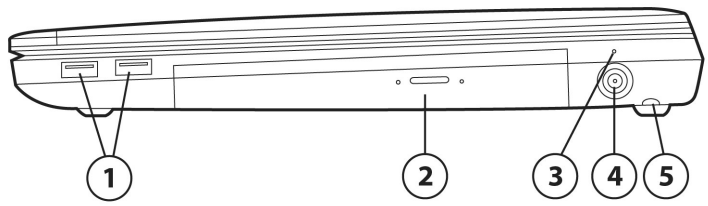
## Overview




1. WWAN antennas
2. WLAN antennas
3. Dual-microphone array*
4. Webcam LED indicator (with optional webcam)
5. Optional 720p HD webcam
6. Stereo speakers
7. HP WebBrowser button with LED indicator
8. Wireless on/off button with LED indicator
9. Optional HP Fingerprint Sensor
10. Touchpad
11. Touchpad pick buttons
12. Touchpad on/off button with LED indicator
13. Stereo microphone in
14. Stereo headphone/line out
15. Media Card Reader
16. Hard drive activity LED indicator
17. (2) USB 3.0 ports
18. HDMI 1.4a port
19 RJ-45/Ethernet port
20. VGA/external monitor connector
21. Security cable slot
22. Power button with LED indicator
23. HP Power Assistant function key
24. Volume mute function key
25. Volume down function key
26. Volume up function key

* Models without optional webcam have single integrated microphone.

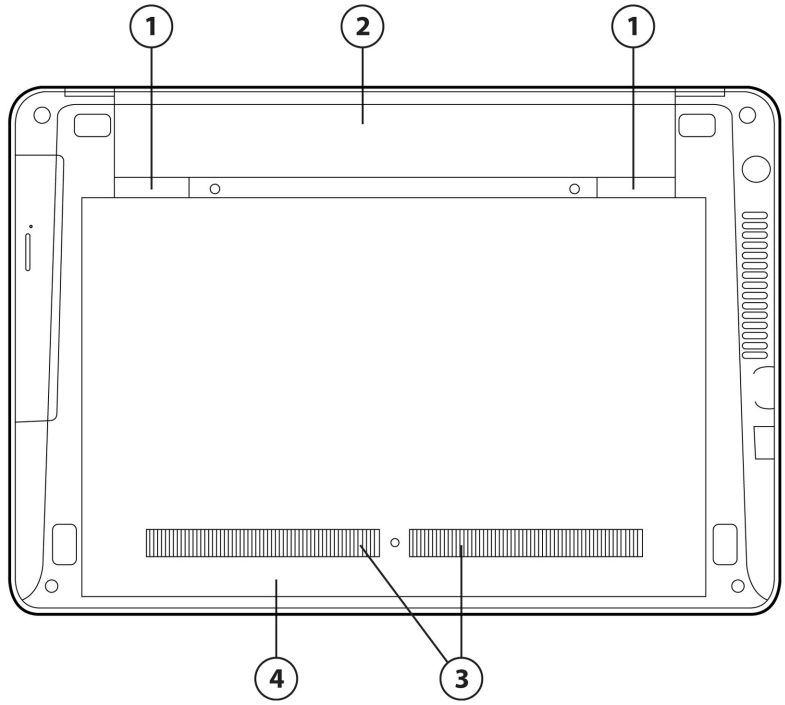
**Right View**



## Overview

1. (1) USB 3.0 port (left)
   (1) USB 2.0 port (right)
2. Optical drive (select models)
3. AC Adapter/battery light
4. Power connector
5. VGA/external monitor connector

**Bottom View**




1. Battery and service door release latches
2. Battery bay
3. Vents
4. Service door

## At A Glance

- Windows 8 versions, Windows 7 versions, SUSE Linux, or FreeDOS
- Thin, lightweight design with brushed aluminum finish for durability and style, wear-resistant HP DuraFinish
- Full-sized spill-resistant keyboard
- Larger Touchpad with gestures support, on/off button with LED indicator
- Enhanced security features including HP Protect Tools, HP Client Security, HP Face Recognition, optional HP Fingerprint Sensor
- Optional HD webcam with dual-microphone array
- HDMI port for connecting to high-resolution displays; USB 3.0 ports
- ArcSoft TotalMedia Suite (Win7 only) for playing, creating, and editing video and audio files
- Cyberlink Media Suite (Win8 only) for playing, creating, and editing video and audio files.
- SRS Premium Sound optimized for high fidelity audio
- Widescreen LED-backlit 13.3-inch diagonal HD display with 16:9 aspect ratio
- Choice of 3rd generation Intel® Core™ i7, i5 and i3 processors, 2nd generation Core™ i5, i3, and Intel Celeron processor
- HP WebBrowser button for convenient online access without long boot-up times
- Flexible wireless connectivity options controlled by HP Connection Manager:
  - Integrated HP Mobile Broadband Module*
  - Integrated 802.11 b/g/n wireless LAN module
  - Integrated 802.11 a/b/g/n or b/g/n with Bluetooth 4.0 High Speed (HS) combo card**

## Overview

- HP Power Assistant (Win7 only) to conserve power, increase battery run-time, monitor power needs, report workforce power consumption
- BFR/PVC-free***, ENERGY STAR qualified and EPEAT Gold registered in the U.S. EPEAT status varies by country- please see epeat.net.

* Available on HP ProBook 4340s/1s for integrated and discrete.
** Available on select models.
*** Meeting the industry definition of 'BFR/PVC-free' per the iNEMI Position Statement on "Low Halogen" Electronics. Plastic parts incorporated into the chassis generally contain < 1000 ppm (0.1%) of bromine or chlorine. Printed circuit board and substrate laminates generally contain < 1500 ppm (0.15%) of total bromine and chlorine. Service parts after purchase may not be BFR/PVC-free. External accessories, including power supplies, power cords, and peripherals as well as the following customer-configurable internal components: ATT SIM card are not BFR/PVC-free.

Features

## OPERATING SYSTEM

| | |
|---|---|
| **Preinstalled** | Windows 8 Pro 64*<br>Windows 7 Professional (available through downgrade rights from Windows 8 Pro)**<br>Windows 8 64<br>Windows 7 Professional 64**<br>Windows 7 Home Premium 64***<br>Windows 7 Home Basic 64***<br>SUSE Linux Enterprise Desktop 11<br>FreeDOS |
| **Supported** | Windows 8 Pro 32*<br>Windows 8 32*<br>Windows 8 Enterprise 32*<br>Windows 8 Enterprise 64*<br>Windows 7 Professional 32***<br>Windows 7 Home Premium 32***<br>Windows 7 Home Basic 32*** |
| **Certified** | Microsoft WHQL<br>SUSE Linux |

* Not all features are available in all editions of Windows 8. Systems may require upgraded and/or separately purchased hardware, drivers and/or software to take full advantage of Windows 8 functionality. See http://www.microsoft.com for details.
** This system is preinstalled with Windows® 7 Pro software and also comes with a license and media for Windows 8 Pro software. You may only use one version of the Windows software at a time. Switching between versions will require you to uninstall one version and install the other version. You must back up all data (files, photos, etc.) before uninstalling and installing operating systems to avoid loss of your data
*** Not all features are available in all editions of Windows 7. This system may require upgraded and/or separately purchased hardware to take full advantage of Windows 7 functionality. See http://www.microsoft.com/windows/windows-7/ for details.

## PROCESSOR

3rd Generation Intel® Core™ i7-3632QM (2.2 GHz, 6 MB L3 cache, 4 cores)*
Up to 3.20 GHz with Intel Turbo Boost Technology
3rd Generation Intel® Core™ i7-3612QM (2.1 GHz, 6 MB L3 cache, 4 cores)*
Up to 3.10 GHz with Intel Turbo Boost Technology
3rd Generation Intel® Core™ i5-3360M (2.8 GHz, 3 MB L3 cache, 2 cores)*
Up to 3.50 GHz with Intel Turbo Boost Technology
3rd Generation Intel® Core™ i5-3320M (2.6 GHz, 3 MB L3 cache, 2 cores)*
Up to 3.30 GHz with Intel Turbo Boost Technology
3rd Generation Intel® Core™ i5-3210M (2.5 GHz, 3 MB L3 cache, 2 cores)*
Up to 3.10 GHz with Intel Turbo Boost Technology
3rd Generation Intel® Core™ i3-3120M (2.5 GHz, 3 MB L3 cache, 2 cores)*
3rd Generation Intel® Core™ i3-3110M (2.4 GHz, 3 MB L3 cache, 2 cores)*
2nd Generation Intel® Core™ i5-2450M (2.5 GHz, 3 MB L3 cache, 2 cores)*
Up to 3.10 GHz with Intel Turbo Boost Technology
2nd Generation Intel® Core™ i3-2370M (2.4 GHz, 3 MB L3 cache, 2 cores)*
2nd Generation Intel® Core™ i3-2350M (2.3 GHz, 3 MB L3 cache, 2 cores)*
2nd Generation Intel® Celeron™ B840 (1.9 GHz, 2 MB L3 cache, 2 cores)

* Multi-Core is designed to improve performance of certain software products. Not all customers or software applications will necessarily benefit from use of this technology. 64-bit computing on Intel® architecture requires a computer system with a

Features

processor, chipset, BIOS, operating system, device drivers, and applications enabled for Intel® 64 architecture. Processors will not operate (including 32-bit operation) without an Intel® 64 architecture-enabled BIOS. Performance will vary depending on your hardware and software configurations. Intel's numbering is not a measurement of higher performance.
**NOTE:** Processor speed denotes maximum performance mode; processors will run at lower speeds in battery optimization mode.

## CHIPSET

Mobile Intel HM76

## GRAPHICS

Integrated:
Intel HD Graphics 4000 (3nd Generation Intel Quad-Core i7; Dual-Core i5 and i3)
Intel HD Graphics 3000 (2nd Generation Intel Dual-Core i5 and i3)
Intel HD Graphics (2nd Generation Intel Celeron configurations)
Discrete:
AMD Radeon HD 7570M with 1GB GDDR5 video memory

## DISPLAY

**Internal**
13.3" diagonal LED-backlit HD anti-glare (1366 x 768)
**External**
Up to 32-bit per pixel color depth
**VGA**
Port supports resolutions up to 2048 x 1536 external resolution @75 Hz
**HDMI**
Supports direct connection to high-definition displays with up to 1920 x 1080 resolution and 7-channel audio with one convenient cable (not included)

## STORAGE AND DRIVES

**Primary Storage Bay**
**Hard Drives**
320 GB 7200 rpm SMART SATA II
320/500 GB/750 5400 rpm SMART SATA II
**HP 3D DriveGuard (Windows only)**
The hard drive is mounted directly to the notebook frame, reducing the transmission of shock to the hard drive

**NOTE:** For hard drives, GB = 1 billion bytes. Actual formatted capacity is less. Up to 16 GB (for Windows 7) and 36 GB (for Windows 8) of system disk is reserved for the system recovery software.

Features

## OPTICAL DRIVES

**Fixed 12.7 mm SATA optical drive**
Blu-ray ROM DVD+/-RW SuperMulti DL Drive
DVD+/-RW SuperMulti DL Drive
DVD-ROM Drive (Japan only)
**Weight saver**

## MEMORY

**Standard**
DDR3 PC3-10600 SDRAM (1333 MHz)
Two SODIMM slots supporting dual-channel memory
2 GB and 4 GB SODIMMs
**Maximum**
Upgradeable to 8192 MB with optional 4096 MB SODIMMs in slots 1 and 2
**Dual-channel**
Maximized dual-channel performance requires SODIMMs of the same size and speed in both memory slots.

**NOTE:** Due to the non-industry standard nature of some third-party memory modules, we recommend HP branded memory to ensure compatibility. If you mix memory speeds, the system will perform at the lower memory speed. With Windows Starter 32-bit operating systems, the amount of usable memory is dependent upon your configuration, so that above 3 GB all memory may not be available due to system resource requirements.

## NETWORKING/COMMUNICATIONS

**Wireless**
Support for a broad range of secure, integrated wireless LAN and wireless WAN options featuring support for the latest industry standards. Broadband Wireless (WWAN) requires a Windows operating system and is available in select countries as a standard, factory configurable feature only. Integrated Bluetooth is also available (factory configurable only) and can be combined with any of the supported wireless LAN and wireless WAN options.

**Broadband Wireless (WWAN)**

HP hs2350 HSPA+ Mobile Broadband Module

HP un2430 EV-DO/HSPA/CDMA Mobile Broadband Module

**Wireless LAN (WLAN)**

Ralink 802.11 b/g/n (1x1)

Atheros 802.11 b/g/n (1x1)
Atheros 802.11 b/g/n (1x1) with Bluetooth® v4.0 combo

Ralink 802.11 b/g/n (1x1) with Bluetooth® v4.0 combo
Atheros 802.11 a/b/g/n (2x2) with Bluetooth® v4.0 combo

Intel 802.11 b/g/n (2x2) with Bluetooth® v4.0

Intel 802.11 a/b/g/n (2x2) with Bluetooth® v4.0

Features

**Communications**

Realtek 10/100/1000* Ethernet Controller

* The term "10/100/1000" or "Gigabit" Ethernet indicates compatibility with IEEE standard 802.3ab for Gigabit Ethernet, and does not connote actual operating speed of 1 Gb/s. For high-speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required.

## AUDIO/MULTIMEDIA

**Audio**

SRS Premium Sound
Integrated stereo speakers
Integrated microphone (dual-microphone array when equipped with optional webcam)
Function keys for volume mute, volume up, volume down; play, rewind, and fast-forward of video and audio files
Stereo headphone/line out
Stereo microphone/line in

**Webcam**

Optional 720p HD webcam

- HD format (widescreen)
- Supports videoconferencing (non-HD) and still image capture
- High quality fixed focus lens
- Video capture at various resolutions up to 1280x720 resolution (720p) and up to 30fps
- M-JPEG compression supports higher frame rates for video capture and videoconferencing
- Improved low light sensitivity
- Improved dynamic range

## KEYBOARDS/POINTING DEVICES/BUTTONS & FUNCTION KEYS

**Keyboard**

The HP spill-resistant keyboard is designed using a thin layer of Mylar film under the keyboard. The 101/102-key compatible keyboard features a full-pitch key layout with desktop keyboard features, such as editing keys, both left and right control and alt keys, and function keys. US and International key layouts are available.

**Pointing Devices**

Touchpad with gestures support, on/off button with LED indicator, two-way scroll, two pick buttons

**Buttons and Function Keys**

Separate launch buttons provide easy access to wireless on/off and HP WebBrowser. Function keys provide control of features including: standby mode, display brightness, external display, HP Power Assistant, volume mute, volume down, volume up, and media control.

## SOFTWARE AND SECURITY

**Preinstalled Software with Windows Operating System**

Cyberlink Media Suite (Windows 8 only)
HP Recovery Manager
HP Support Assistant
HP Hotkey Support Software
HP Peak Power Manager (web download)* HP Power Assistant (Windows 7 only)
HP Connection Manager (Windows 7 only)

## Features

HP Wireless Hotspot (Windows 8 and web download)
HP Wireless Assistant (Windows 7 only)
Intel Wireless Display**
ArcSoft Total Media Suite (Windows 7 only)
Microsoft Office 2010 60 days trial (Windows 8 only)
Microsoft Office Starter: reduced-functionality Word and Excel only, with advertising. No PowerPoint or Outlook.
Buy Office 2010 to use the full-featured software.*** (Windows 7 only)
Skype ready****
WinZip (Windows 7 only)
**NOTE:** HP Recovery Manager enables fast recovery of the factory preinstalled image if the system becomes corrupted or if important system files are accidentally deleted. Up to 16 GB (for Windows 7) and 36 GB (for Windows 8) of system disk is reserved for the system recovery software.

* HP Peak Power Manager replaces HP Power Assistant for both Win7 and Win8. HP Peak Power Manager will be available on the web for download for existing product owners.
** Integrated Intel Wi-Di feature is available on select configurations only and requires separately purchased projector, tv or computer monitor with an integrated or external Wi-Di receiver. External Wi-Di receivers connect to the projector, tv or computer monitor via a standard HDMI cable, also sold separately.
*** Includes reduced functionality versions of Word and Excel. Purchase of Product Key required to activate full Office 2010 suite available at participating resellers/retailers and http://www.office.com.
****Skype-ready. Skype is not offered in China.

**Security**

**Standard**
HP ProtectTools (Windows 7 only)
HP Client Security (Win8 only)
Microsoft Defender
Drive Encryption (will be web-only ready at Win8 GA date)
Credential Manager
HP Security Manager
HP Spare Key
Device Access Manager w/ JITA
One Step Logon
File Sanitizer for HP ProtectTools (Windows 7 only)
Enhanced Pre-Boot Security
HP Face Recognition
Security Lock slot

**Optional**
Security Lock
Intel AT (requires a Computrace subscription)*
HP Fingerprint reader
Microsoft Security Essentials

**NOTE:** The Computrace agent is shipped turned off, and must be activated by customers when they purchase a subscription. Subscriptions can be purchased for terms ranging multiple years. Service is limited, check with Absolute for availability outside the U.S.

For more information on HP security solutions refer to: http://www.hp.com/go/security.

## POWER

**Power Supply**

Models with discrete graphics:
External 90W HP Smart AC Adapter
Models with integrated graphics:
External 65W HP Smart AC Adapter
Power cord included is 6-foot (1.8 meter).
Total length including external AC adapter is 12 feet (3.66 meter).
HP Fast Charge

**Primary Battery**

HP 6-cell Lithium-Ion Battery (51 WHr)

**Battery Life***

| | Configurations with integrated graphics | Configurations with discrete graphics (1 GB) |
|---|---|---|
| **6-cell (51 WHr) battery** | Up to 8 hours 30 minutes | Up to 8 hours 15 minutes |

**System Standby Time**

Up to 1 week

*Battery life will vary depending on the product model, configuration, loaded applications, features, use, wireless functionality and power management settings. The maximum capacity of the battery will naturally decrease with time and usage. See MobileMark07 battery benchmark http://www.bapco.com/products/mobilemark2007 for additional details.
** Configurations with integrated graphics.
**NOTE:** Fast Charge recharges your battery up to 90% within 90 minutes when the system is off. Please note that 9-cell batteries do not support Fast Charge.

**Power Conservation**

Supports enhanced Intel SpeedStep technology (allows Battery Optimized Mode, Maximum Performance Mode, or Automatic mode)
AMD PowerPlay technology (discrete models)
Hibernation
Standby
ACPI compliance

## ENVIRONMENTAL

ENERGY STAR
IT ECO Declaration
EPEAT Gold where HP registers commercial notebook products. See http://www.epeat.net for registration status in your country.

**NOTE:** This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks.

Features

## WEIGHTS & DIMENSIONS

**Weight**

Starting at 4.05 lb (1.84 kg) without optical drive
Starting at 4.49 lb (2.04 kg) with optical drive
Starting at 4.05 lb (1.84 kg) with SSD and without optical drive (weight will vary by configuration)

**Dimensions** (w x d x h)

12.83 x 9.02 x .97 in
32.6 x 22.9 x 2.4 cm (at front)

**NOTE:** Height varies depending upon where on the notebook the measurement is made. Weight varies by configuration and components. Weight includes 6-cell battery, hard drive, 1 GB memory, and no optical drive. Weight varies by configuration and components.

## PORTS/SLOTS

**Ports**

VGA - One
USB 3.0 - Three
USB 2.0 - One
HDMI 1.4a - One
Stereo microphone input - One
Headphone/line out - One
RJ-45 (Ethernet) - One
Power connector - One

**Digital Media Slots**

1 Multi-media Reader Slot supporting SD, SDHC, SDXC, MMC, MMC+, Memory Stick

## SERVICE AND SUPPORT

HP Services offers limited 3-year, 1-year and 90-day warranty options depending on country;
1-year limited warranty on primary battery. On-site service and warranty upgrades are also available. HP Care Pack Services extend service contracts beyond the standard warranties. To choose the right level of service for your HP product, use the HP Care Pack Services Lookup Tool at: http://www.hp.com/go/lookuptool. Additional HP Care Pack Services information by product is available at: http://www.hp.com/hps/carepack.

**NOTE:** Certain restrictions and exclusions apply. Consult the HP Customer Support Center for details.
http://h20000.www2.hp.com/bizsupport/TechSupport/ProductRoot.jsp

## SYSTEM UNIT

| | | |
|---|---|---|
| **Stand-Alone Power Requirements** (AC Power) | **Nominal Operating Voltage** | 19 V |
| | **Average Operating Power** | Integrated graphics: TBD W<br>Discrete graphics: TBD W |
| | **Max Operating Power** | < 65 W<br>or<br>< 90 W |
| **Temperature** | **Operating** | 32° to 95° F (0° to 35° C) (not writing optical)<br>41° to 95° F (5° to 35° C) (writing optical) |
| | **Non-operating** | -4° to 140° F (-20° to 60° C) |
| **Relative Humidity** | **Operating** | 10% to 90%, non-condensing |
| | **Non-operating** | 5% to 95%, 101.6° F (38.7° C) maximum wet bulb temperature |
| **Shock** | **Operating** | 40 G, 2 ms, half-sine |
| | **Non-operating** | 200 G, 2 ms, half-sine |
| **Random Vibration** | **Operating** | 0.75 grms |
| | **Non-operating** | 1.50 grms |
| **Altitude** (unpressurized) | **Operating** | -50 to 10,000 ft (-15.24 to 3,048 m) |
| | **Non-operating** | -50 to 40,000 ft (-15.24 to 12,192 m) |
| **Planned Industry Standard Certifications** | **UL** | Yes |
| | **CSA** | Yes |
| | **FCC Compliance** | Yes |
| | **ENERGY STAR®** | Select models* |
| | **EPEAT** | Registered Gold in United States** |
| | **ICES** | Yes |
| | **Australia / NZ A-Tick Compliance** | Yes |
| | **CCC** | Yes |
| | **Japan VCCI Compliance** | Yes |
| | **KC** | Yes |
| | **BSMI** | Yes |
| | **CE Marking Compliance** | Yes |
| | **BNCI or BELUS** | Yes |
| | **CIT** | Yes |
| | **GOST** | Yes |
| | **Saudi Arabian Compliance (ICCP)** | Yes |
| | **SABS** | Yes |
| | **UKRSERTCOMPUTER** | Yes |

Technical Specifications

* Configurations of the HP ProBook 4340s/1s that are ENERGY STAR qualified are identified as HP ProBook 4340s/1s ENERGY STAR on HP websites and on www.energystar.gov.
** EPEAT registration varies by country. See www.epeat.net for registration status by country.
EPEAT status listed above applies to U.S.

For accessibility information on HP products, please visit: http://www.hp.com/accessibility.

## DISPLAY

| | | | |
|---|---|---|---|
| **13.3-inch LED HD (1366 x 768) anti-glare** | **Active Area** (W x H) | 11.53 x 6.49 in (29.3 x 16.5 cm) | |
| | **Diagonal Size** | 13.3 in (33.8cm) | |
| | **Surface Treatment** | Anti-glare | |
| | **Contrast Ratio** | 400:1 (typical) | |
| | **Refresh Rate** | 60 Hz | |
| | **Brightness** | 200 nit (typical) | |
| | **Pixel Resolution** | **Pitch** | 0.215 mm |
| | | **Format** | 1366 x 768 |
| | | **Configuration** | RGB Stripe |
| | **Backlight** | LED | |
| | **PPI** | 118 ppi | |
| | **Viewing Angle** | ±30° Horizontal, ±10° Vertical (minimum)<br>30/30/20/10 (Left/Right/Down/Up) (minimum) or<br>45/45/35/25 (Left/Right/Down/Up) (typical) | |

## STORAGE AND DRIVES

**Internal Storage**

## Technical Specifications

| | | | |
|---|---|---|---|
| **320 GB 7200 rpm SATA Hard Drive** | **Drive Weight** | 0.25 lbs (115 g) | |
| | **Capacity** | 320 GB | |
| | **Height** | 0.37 in (9.5 mm) | |
| | **Width** | 2.75 in (70 mm) | |
| | **Interface** | ATA-8, SATA 2.6, 3.0 Gb/s, NCQ | |
| | **Transfer Rate** | **Synchronous** (maximum) | 300 MB/s (Drive Capability) |
| | **Seek Time** (typical reads, including settling) | **Single Track** | 1.5 ms |
| | | **Average** | 11 ms |
| | | **Maximum** | 22 ms |
| | **Rotational Speed** | 7200 rpm | |
| | **Logical Blocks** | 625,142,448 | |
| | **Operating Temperature** | 32° to 140° F (0° to 60° C) [case temp] | |
| | **Features** | ATA Security | |
| **750 GB 5400 rpm SATA Hard Drive** | **Drive Weight** | 0.27 lb (125 g) or 0.22 lb (101 g) | |
| | **Capacity** | 750 GB | |
| | **Height** | 0.50 in (12.7 mm) or 0.37 in (9.5 mm) | |
| | **Width** | 2.75 in (70 mm) | |
| | **Interface** | ATA-8, SATA 2.6, 3.0 Gb/s, NCQ | |
| | **Transfer Rate** | **Synchronous** (maximum) | 300 MB/s (Drive Capability) |
| | **Seek Time** (typical reads, including settling) | **Single Track** | 3 ms |
| | | **Average** | 13 ms |
| | | **Maximum** | 24 ms |
| | **Rotational Speed** | 5400 rpm | |
| | **Logical Blocks** | 1,465,149,168 | |
| | **Operating Temperature** | 32° to 140° F (0° to 60° C) [case temp] | |
| | **Features** | ATA Security | |

## Technical Specifications

| | | | |
|---|---|---|---|
| **500 GB 5400 rpm SATA Hard Drive** | **Drive Weight** | 0.22 lb (101 g) | |
| | **Capacity** | 500 GB | |
| | **Height** | 0.37 in (9.5 mm) | |
| | **Width** | 2.75 in (70 mm) | |
| | **Interface** | ATA-8, SATA 2.6, 3.0 Gb/s, NCQ | |
| | **Transfer Rate** | **Synchronous** (maximum) | 300 MB/s (Drive Capability) |
| | **Seek Time** (typical reads, including settling) | **Single Track** | 3 ms |
| | | **Average** | 13 ms |
| | | **Maximum** | 24 ms |
| | **Rotational Speed** | 5400 rpm | |
| | **Logical Blocks** | 976,773,168 | |
| | **Operating Temperature** | 32° to 140° F (0° to 60° C) [case temp] | |
| | **Features** | ATA Security | |

| | | | |
|---|---|---|---|
| **320 GB 5400 rpm SATA Hard Drive** | **Drive Weight** | 0.22 lb (101 g) | |
| | **Capacity** | 320 GB | |
| | **Height** | 0.37 in (9.5 mm) | |
| | **Width** | 2.75 in (70 mm) | |
| | **Interface** | ATA-8, SATA 2.6, 3.0 Gb/s, NCQ | |
| | **Transfer Rate** | **Synchronous** (maximum) | 300 MB/s (Drive Capability) |
| | **Seek Time** (typical reads, including settling) | **Single Track** | 3 ms |
| | | **Average** | 13 ms |
| | | **Maximum** | 24 ms |
| | **Rotational Speed** | 5400 rpm | |
| | **Logical Blocks** | 625,142,448 | |
| | **Operating Temperature** | 32° to 140° F (0° to 60° C) [case temp] | |
| | **Features** | ATA Security | |

Technical Specifications

| | | | |
|---|---|---|---|
| **128 GB 2.5-inch SATA Solid State Drive** | **Drive Weight** | 75 Grams | |
| | **Capacity** | 128 GB | |
| | **Height** | 0.276 in (7 mm) | |
| | **Width** | 2.76 in (70 mm) | |
| | **Interface** | SATA Gen 2 | |
| | **Performance** | **Maximum Sequential Read** | **Maximum Sequential Write** |
| | | 250 MB/s | 140 MB/s |
| | **Logical Blocks** | 250,069,680 | |
| | **Operating Temperature** | 32° to 158°F (0° to 70°C) [case temp] | |
| | **Features** | ATA Security; ATA-7; SATA 2.6; DIPM; TRIM | |

| | | | |
|---|---|---|---|
| **Optical Drives** | | | |
| **DVD+/-RW SuperMulti DL Drive** | **Access Times** | Random | <140ms CD (typical)<br>< 160 ms DVD (typical) |
| | **Max Data Transfer Rate** | 24X CD-ROM<br>8X DVD<br>24X CD-R<br>24X CD-RW<br>8X DVD+R<br>8X DVD+RW<br>8X DVD-R<br>6X DVD-RW<br>6X - DVD+R Dual Layer<br>6X - DVD-R Dual Layer<br>5X DVD-RAM | |
| | **Transfer Mode** | UDMA Mode 5 | |
| | **Interface** | Gen 1 SATA | |
| | **Supported Media** (read) | CD-DA, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW, DVD-RAM | |
| | **Supported Media** (write) | CD-R, CD-RW, DVD+R, DVD+RW, DVD-R, DVD-RW, DVD-RAM, DVD+R DL, DVD-R DL | |
| | **Max Media Capacity** (read) | 8.5 GB | |
| | **Max Media Capacity** (write) | 8.5 GB | |
| | **Transport** | Tray Loading | |

Technical Specifications

| | | | |
|---|---|---|---|
| **Blu-ray ROM DVD+/-RW SuperMulti DL Drive** | **Access Times** | Random | <190 ms CD-ROM (typical)<br>< 180ms DVD-ROM (typical)<br><230 ms BD-ROM (typical) |
| | **Max Data Transfer Rate** | 24X CD-ROM<br>8X DVD-ROM<br>24X CD-R<br>16X CD-RW<br>8X DVD+R<br>8X DVD+RW<br>8X DVD-R<br>6X DVD-RW<br>4X - DVD+R Dual Layer<br>4X - DVD-R Dual Layer<br>5X DVD-RAM<br>6X BD-ROM | |
| | **Transfer Mode** | UDMA Mode 5 | |
| | **Interface** | Gen 1 SATA | |
| | **Supported Media** (read) | CD-DA, , CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW. DVD-RAM, BD-ROM, BD-R, BD-RE | |
| | **Supported Media** (write) | CD-R, CD-RW, DVD+R, DVD+R DL, DVD+RW, DVD-R, DVD-R DL, DVD-RW, DVD-RAM | |
| | **Max Media Capacity** (read) | 50.0 GB | |
| | **Max Media Capacity** (write) | 8.5GB | |
| | **Transport** | Tray Loading | |

## SECURITY

| | | |
|---|---|---|
| **HP Fingerprint Sensor** (optional) | **Mobile Voltage Operation** | 3.0V-3.6V Single Supply |
| | **Operating Temperature** | 32° - 158°F (0° - 70°C) |
| | **Current Consumption @ 3.3V** | Less than 70 mA peak imaging and scrolling<br>Less than 25 mA hardware finger detection<br>Advanced Power Management |
| | **High-Rate Image Capture** | Up to 240 image frames /sec |
| | **ESD Resistance** | IEC 61000-4-2 Level 4 (±15KV) |
| | **Detection Matrix** | 192 x 16 Pixels<br>9.7 mm x 0.81 mm<br>500 ppi High-Resolution Images |

## NETWORKING/COMMUNICATIONS

| | | |
|---|---|---|
| **Integrated Realtek RTL8151FH-CG 10/100/1000 NIC** | **Ethernet Features** | 10 Mbit/s operation (10BASE-T; IEEE 802.3i; IEEE 802.3 clauses 13-14)<br>100 Mbit/s operation (100BASE-TX; IEEE 802.3u; IEEE 802.3 clauses 21-30)<br>1000 Mbit/s operation (1000BASE-T; IEEE 802.3ab; IEEE 8023 clauses 40)<br>Auto-Negotiation (Automatic Speed Selection)<br>Full Duplex Operation at all Speeds, Half Duplex operation at 10 and 100 Mbit/s<br>IEEE 802.1p QoS (Quality of Service) Support<br>IEEE 802.1q VLAN support<br>IEEE 802.3x Flow Control (IEEE 802.3 clauses 31-32; configurable)<br>IEEE 802.3az EEE (Energy Efficient Ethernet)<br>Jumbo Frame 9K<br>Auto MDI/MDIX Crossover cable detection |
| | **Power Management Support** | ACPI compliant - multiple power modes<br>Situation-sensitive features reduce power consumption<br>Advanced link down power saving for reducing link down power consumption |
| | **Performance Features** | TCP/IP/UDP Checksum Offload (configurable)<br>Protocol Offload (ARP & NS)<br>Large send offload and Giant send offload<br>Receiving Side Scaling |
| | **Manageability** | Wake-on-LAN from standby and hibernation (Magic Packet and Microsoft Wake-Up Frame); Wake-on-LAN from off (Magic Packet only)<br>PXE 2.1 Remote Boot<br>Statistics Gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB (802.3x, clause 30))<br>Comprehensive diagnostic and configuration software suite<br>Virtual Cable Doctor for Ethernet cable status |
| | **Interface** | PCI Express 1.1 x1 to fully support ASPM L0s/L1 and CLKREQ |
| | **NIC Device Driver Name** | Realtek PCIe GBE Ethernet Family Controller |

Technical Specifications

| | | |
|---|---|---|
| **HP un2430 EV-DO/HSPA Mobile Broadband Module** | **Technology/Operating Bands** | GSM/GPRS/EDGE: 850MHz(Cell), 900MHz(EGSM), 1800MHz(DCS), 1900MHz (PCS)<br>UMTS/WCDMA with receive diversity: 2100MHz (UTRA FDD Band I), 1900MHz (UTRA FDD Band II), AWS (UTRA FDD Band IV), 900MHz(UTRA FDD Band VIII), 850MHz (UTRA FDD Band V)<br>1xEVDO/1xRTT with receive diversity: 850MHz (Band Class0-Cell), 1900MHz (Band Class1-PCS) |
| | **Wireless Protocol Standards** | GSM/GPRS/EDGE: Class A, Multi-slot class 10 operation, coding schemes CS1 - CS4 and MSC1 - MSC9.<br>UMTS/WCDMA: Release 99 and Release 6<br>CDMA: 1xEVDO Release 0 and Release A, IS-95A, IS-95B, IS-856, IS-2000 |
| | **Wireless Parametric Standards** | Meets or exceeds TIA/EIA IS-98-D |
| | **Maximum Data Rates** | UMTS (HSPA) - 14.4 Mbps (Download ), 5.76Mbps (Upload)<br>CDMA (EVDO Release A) - 3.1 Mbps (Download), 1.8Mbps (Upload) |
| | **GPS** | Standalone GPS enabled<br>gpsOneXTRATM™ |
| | **GPS Bands** | L1 - 1575.42 MHz |
| | **Maximum Output Power** | GSM/GPRS/EDGE: 32dBm (+/-1)<br>WCDMA: 24dBm (+0.7/-2.3)<br>CDMA: 24dBm (+0.7/-2) |
| | **Maximum Power Consumption** | 2750mA (peak); 1100mA (average) |
| | **Power Consumption, Idle Not Connected** | 20 mA |
| | **Power Management** | USB selective suspend<br>Integrated notebook wireless button |
| | **Antenna Type** | Dual high efficiency 5 band antennae with spatial diversity, mounted in the display enclosure |
| | **Form Factor** | PCI-Express MiniCard, USB 2.0 interface |
| | **Weight** | 11.5 g |
| | **Dimensions** (Length x Width x Thickness) | 2.01 x 1.18 x 0.18 in (51 x 30 x 5 mm) |
| | **Voltage, Operating** | 3.3v +/- 10% |
| | **Temperature, Operating** (from TIA/EIA/IS-98-D) | -22° to 158° F (-30° to 70° C) (full RF performance)<br>-22° to 167° F (-30° to 75° C) (reduced RF performance) |
| | **Temperature, Non-operating, 96 hours** (from MIL-STD 202 Method 108) | -40° to 185° F (-40° to 85° C) |
| | **Humidity, Non-operating** | 95% relative humidity for 48 hours @ 185° F (85° C) (non-condensing) |
| | **Configuration Utilities** | HP Connection Manager |
| | **LED Activity** | LED Off - Radio Off;<br>Solid LED On - Radio On |

## Technical Specifications

| | | |
|---|---|---|
| **HP hs2350 HSPA+ Mobile Broadband Module** | **Technology/Operating Bands** | GSM/GPRS/EDGE: 850MHz(Cell), 900MHz(EGSM), 1800MHz(DCS), 1900MHz (PCS)<br>UMTS/WCDMA with receive diversity: 2100MHz (UTRA FDD Band I), 1900Mhz (UTRA FDD Band II), 900Mhz(UTRA FDD Band VIII), 850 MHz (UTRA FDD Band V) |
| | **Wireless Protocol Standards** | GSM/GPRS/EDGE: Class B, Multi-slot class 10 operation, coding schemes CS1 - CS4 and MSC1 - MSC9.<br>UMTS/WCDMA: Release 99 and Release 7<br>Advanced Receiver Type 3i |
| | **Wireless Parametric Standards** | Complies with 3GPP specifications |
| | **Maximum Data Rates** | UMTS (HSPA) - 21 Mbps (Download ), 5.76Mbps (Upload) |
| | **GPS** | Standalone, A-GPS (Internet- and Network assisted) |
| | **GPS Bands** | 1575.42 MHz (± 1.023 MHz) |
| | **Maximum Output Power** | GSM/EDGE<br>GSM850 & GSM900 bands<br>GPRS: +33 dBm ± 2 dBm (class 4)<br>EGPRS: +27 dBm ± 3 dBm (class E2)<br><br>DCS1800 & PCS1900 bands<br>GPRS: +30 dBm ± 2 dBm (class 1)<br>EGPRS: +26 dBm +4 / -3 dBm (class E2)<br><br>UMTS<br>UTRA FDD Bands<br>+24 dBm +4 / -3 dBm (class 3) |
| | **Maximum Power Consumption** | 2000mA (peak); 600mA (average) |
| | **Power Consumption, Sleep Mode** | 5 mA |
| | **Power Management** | USB selective suspend<br>Integrated notebook wireless button |
| | **Antenna Type** | Dual high efficiency 5 band antennae with spatial diversity, mounted in the display enclosure |
| | **Form Factor** | PCI-Express MiniCard, USB 2.0 interface |
| | **Weight** | < 12 g |
| | **Dimensions** (Length x Width x Thickness) | 2.01 x 1.18 x 0.18 in (51 x 30 x 5 mm) |
| | **Voltage, Operating** | 3.3v +/- 9% |
| | **Temperature, Operating** | 14° to 149° F (-10° to 65° C) (full RF performance)<br>14° to 167° F (-10° to 75° C) (reduced RF performance) |
| | **Temperature, Non-operating, 96 hours** (from MIL-STD 202 Method 108) | -22° to 185° F (-30° to 85° C) |
| | **Humidity, Non-operating** | 85% relative humidity for 48 hours @ 185° F (85° C) (non-condensing) |
| | **Configuration Utilities** | HP Connection Manager |

| | | |
|---|---|---|
| | **LED Activity** | LED Off - Radio Off;<br>Solid LED On - Radio On |
| **Intel Centrino Advanced - N 6235 802.11a/b/g/n (2x2) Bluetooth v4.0 combo** | **Wireless LAN Standards** | IEEE 802.11a<br>IEEE 802.11b<br>IEEE 802.11g<br>IEEE 802.11n |
| | **Interoperability** | Wi-Fi certified<br>Cisco Compatible Extensions Program compliant with Microsoft Windows 7, Windows Vista and XP (details at: http://www.hp.com/go/notebooks/WLAN) |
| | **Frequency Band** | 2.4 GHz and 5 GHz |
| | **Data Rates** | 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps<br>802.11b: 1, 2, 5.5, 11 Mbps<br>802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps<br>802.11n: 66 possible data rates, ranging from 6 Mbps to 300 Mbps, depending on the combination of Bandwidth, Modulation Coding Scheme, and Guard Interval used, as defined in IEEE 802.11n specification |
| | **Modulation** | Direct Sequence Spread Spectrum<br>DBPSK, DQPSK, CCK, OFDM, BPSK, QPSK, 16-QAM, 64-QAM |
| | **Security**[1] | Supports 64- and 128-bit WEP, WPA, WPA2, hardware-accelerated AES, 802.1x authentication types EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, LEAP, EAP-FAST.<br><br>Support for Cisco Security Features (proven compatibility with Cisco Aironet infrastructure products through the Cisco Compatible Extensions Program Version 5) with Microsoft Windows 7, Windows Vista and XP only. |
| | **Sub-channels** | Multinational support with frequency bands and channels compliant to local regulations. |
| | **Media Access Protocol** | CSMA/CA (Collision Avoidance) with ACK |
| | **Network Architecture Models** | Ad-hoc (Peer to Peer)<br>Infrastructure (Access Point Required) |
| | **Roaming** | IEEE 802.11 compliant roaming between access points |
| | **Output Power**[2] | 13.5 dBm , nominal |
| | **Power Consumption** | Idle associated: 250 mW<br>Idle unassociated: 100 mW<br>Radio disabled: 75mW<br>Transmit: 2.0 W (max)<br>Receive: 1.6 W (max) |
| | **Power Management** | ACPI compliant power management<br>802.11 compliant power saving mode |
| | **Receiver Sensitivity**[3] | 54 Mbps: -71 dBm, 11 Mbps: -85 dBm , 1 Mbps: -95 dBm |
| | **Antenna Connections** | High efficiency dual band antenna with spatial diversity, mounted in the display enclosure |
| | **Form Factor** | PCI-Express Half-MiniCard 1.2 |
| | **Weight** | 0.013 lb (6 g) |

Technical Specifications

| | | | |
|---|---|---|---|
| | **Dimensions** | 0.19 x 1.06 x 1.18 in (4.75 x 26.8 x 30 mm) | |
| | **Operating Voltage** | 3.3v +/- 10% | |
| | **Temperature** | Operating<br>Non-operating | 14° to 158° F (-10° to 70° C)<br>-40° to 176° F (-40° to 80° C) |
| | **Humidity** | Operating<br>Non-operating | 10% to 90% (non-condensing)<br>5% to 95% (non-condensing) |
| | **Altitude** | Operating<br>Non-operating | 0 to 10,000 ft (3,048 m)<br>0 to 50,000 ft (15,240 m) |
| | **Configuration Utility**[4] | Microsoft Windows XP<br>Choice of Configuration Utility:<br>• Microsoft Windows XP Wireless Network Connection Manager<br>• Broadcom Wireless Configuration Utility (required for Cisco Compatible Extensions support)<br><br>Microsoft Windows Vista<br>• Microsoft Windows Vista Wireless Network Connection Manager<br>• Broadcom IHV extensions for Windows Vista available to support Cisco Compatible Extensions.<br><br>Microsoft Windows 7<br>• Microsoft Windows 7 Wireless Network Connection Manager<br>• Broadcom IHV extensions for Windows 7 available to support Cisco Compatible Extensions. | |
| | **LED Activity** | LED Off - Radio OFF; Solid LED On - Radio ON | |

1. Check latest software/driver release for updates on supported security features.
2. Maximum output power may vary by country according to local regulations.
3. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CCK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).
4. WLAN supplier's client utility is required for Cisco Compatible Extensions support with Microsoft Windows XP. WLAN may also be compatible with certain third-party software supplicants. WLAN supplier IHV extensions required for Cisco Compatible Extensions support for Microsoft Windows Vista.

| | | |
|---|---|---|
| **Bluetooth 4.0 Wireless Technology** | **Bluetooth Specification** | 2.1+EDR, 3.0+HS, 4.0 Compliant |
| | **Dimensions** | 1.18 x 0.26 x 0.13 in (30 x 6.5 x 3.25 mm) |
| | **Frequency Band** | 2402 to 2480 MHz |
| | **Number of Available Channels** | 79 (1 MHz) available channels |
| | **Data Rates and Throughput** | 3 Mbps data rate; throughput up to 2.17 Mbps<br>Synchronous Connection Oriented links up to 3, 64 kbps, voice channels<br>Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric or 1306.9 kbps symmetric |
| | **Transmit Power** | Max 4 dBm (Bluetooth Class II) |
| | **Receiver Sensitivity** | Better than -80 dBM at 0.1 % raw bit error rate |

Technical Specifications

| | | |
|---|---|---|
| **Power Consumption** | Average 230mW | |
| | Sleep <1 mW | |
| **Antenna** | Internally integrated within module | |
| **Range** | Up 33 ft (10 m) | |
| **Electrical Interface** | USB 2.0 compliant | |
| | Microsoft Windows Plug and Play compliant | |
| **Bluetooth Software Supported** | Broadcom Bluetooth for Windows | |
| | Microsoft Windows Bluetooth Software | |
| **Link Topology** | Point to Point, Multipoint Pico Nets up to 7 slaves | |
| **Security** | Full support of Bluetooth Security Provisions | |
| **Power Management** | Microsoft Windows ACPI, and USB Bus Support | |
| | Self configurable to optimize power conservation in all operating modes, including Standby, Hold, Park, and Sniff | |
| **Certifications** | All necessary regulatory approvals for supported countries, including: | |
| | FCC (47 CFR) Part 15C, Section 15.247 & 15.249 | |
| | ETS 300 328, ETS 300 826 | |
| | Low Voltage Directive IEC950 | |
| | UL, CSA, and CE Mark | |
| **Temperature** | Operating | -4° to 158° F (-20° to 70° C) |
| | Non-operating | -40° to 176° F (-40° to 80° C) |
| **Humidity** | Operating | 10% to 90% |
| | Non-operating | 5% to 95% |
| **Altitude** | Operating | 15,000 ft (4,572 m) |
| | Non-operating | 40,000 ft (12,192 m) |
| **Bluetooth Profiles Supported** | Serial Port Profile (SPP)[1] | |
| | Service Discovery Applicaton Profile (SDAP) | |
| | Dial-Up Networking (DUN)[1,2] | |
| | Generic Object Exchange Profile (GOEP)[1,2] | |
| | Object Push Profile (OPP)[1,2] | |
| | File Transfer Profile (FTP) | |
| | Synchronization Profile (SYNC) | |
| | Hard Copy Cable Replacement (HCRP)[1,2] | |
| | Personal Area Networking Profile (PAN)[1,2] | |
| | Human Interface Device Profile (HID)[1,2,3] | |
| | FAX Profile (FAX) | |
| | Basic Imaging Profile (BIP)[2] | |
| | Headset Profile (HSP) | |
| | Hands Free Profile (HFP) | |
| | Advanced Audio Distribution Profile (A2DP) | |

1. indicates the profile is supported by Microsoft Windows XP SP2
2. indicates the profile is part of Windows Vista

| | | |
|---|---|---|
| **Atheros AR9485 802.11 b/g/n WiFi Adapter (1x1)** | **Wireless LAN Standards** | IEEE 802.11b<br>IEEE 802.11g<br>IEEE 802.11n |
| | **Interoperability** | Wi-Fi certified |
| | **Frequency Band** | 2.4 GHz |
| | **Data Rates** | 802.11b: 1, 2, 5.5, 11 Mbps<br>802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps<br>802.11n: many possible data rates, ranging from 6 Mbps to 300 Mbps, depending on the combination of Bandwidth, Modulation Coding Scheme, and Guard Interval used, as defined in IEEE 802.11n specification |
| | **Modulation** | Direct Sequence Spread Spectrum<br>DBPSK, DQPSK, CCK, OFDM, BPSK, QPSK, 16-QAM, 64-QAM |
| | **Security**[1] | Supports 64- and 128-bit WEP, WPA, WPA2, hardware-accelerated AES, 802.1x authentication types EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, LEAP, EAP-FAST. |
| | **Sub-channels** | Multinational support with frequency bands and channels compliant to local regulations. |
| | **Media Access Protocol** | CSMA/CA (Collision Avoidance) with ACK |
| | **Network Architecture Models** | Ad-hoc (Peer to Peer)<br>Infrastructure (Access Point Required) |
| | **Roaming** | IEEE 802.11 compliant roaming between access points |
| | **Output**2 | 13.5 dBm, nominal |
| | **Power Consumption** | Transmit: 2.0 W (max)<br>Receive: 1.6 W (max)<br>Associated to Access Point, Idle: 250 mW nominal<br>Wireless Button Off: 100 mW nominal<br>Radio disabled: 75 mW nominal |
| | **Power Management** | ACPI compliant power management<br>802.11 compliant power saving mode |
| | **Receiver Sensitivity**[3] | 72.2 Mbps: -70 dbm, 54 Mbps: -74 dBm, 11 Mbps: -88 dBm , 1 Mbps: -95 dBm |
| | **Antenna Connections** | High efficiency antenna with spatial diversity, mounted in the display enclosure |
| | **Form Factor** | PCI-Express Half-MiniCard 1.2 |
| | **Weight** | 0.013 lb (6 g) |
| | **Dimensions** | 0.19 x 1.06 x 1.18 in (4.75 x 26.8 x 30 mm) |
| | **Operating Voltage** | 3.3v +/- 9% |
| | **Temperature** | Operating: 14° to 158° F (-10° to 70° C)<br>Non-operating: -40° to 176° F (-40° to 80° C) |
| | **Humidity** | Operating: 10% to 90% (non-condensing)<br>Non-operating: 5% to 95% (non-condensing) |
| | **Altitude** | Operating: 0 to 10,000 ft (3,048 m)<br>Non-operating: 0 to 50,000 ft (15,240 m) |
| | **LED Activity** | LED Off - Radio OFF; Solid LED On - Radio ON |

1. Check latest software/driver release for updates on supported security features.
2. Maximum output power may vary by country according to local regulations.
3. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).

## AUDIO/MULTIMEDIA

| | | |
|---|---|---|
| **Hardware** | **Implementation** | IDT 92HD87 High Definition CODEC |
| | **Function Key Volume Controls** | Volume up, volume down, and mute |
| | **Full Duplex** | Yes |
| | **Microphone In** | Stereo |
| | **Headphone/Line Out** | Stereo |
| | **Integrated Microphone** | Yes, dual digital microphone array when equipped with optional webcam |
| **Audio Output Quality** | **Frequency Response** | 20 Hz - 20 kHz |
| | **Signal to Noise Ratio** | >85 dB |
| | **Total Harmonic Distortion** | 0.01% |
| | **Noise Floor** | -110 dB |
| | **Play/Record Sampling Rate**(s) | 8 kHz - 48kHz |
| | **DAC** | 16, 20 or 24-bit |
| | **ADC** | 16 or 20-bit |
| **Internal Stereo Speaker** | **Power Rating** | 2 Watts |
| | **Impedance** | 4 ohms |

## POWER

## Technical Specifications

| | | | |
|---|---|---|---|
| **HP 90W Smart AC Adapter (discrete configurations)** | **Dimensions** | 5.00 x 1.97 x 1.1 in (12.7 x 5.0 x 2.9 cm) | |
| | **Weight** | 0.82 lb (370 g) | |
| | **Input** | 100 to 240 VAC | |
| | | **Input Efficiency** | 87% min at 115 VAC |
| | | **Input frequency range** | 47 to 63 Hz |
| | | **Input AC current** | 1.5 A at 90 VAC, 0.75 A at 180 VAC PFC Version<br>2.4 A at 90 VAC, 1.2 A at 180 VAC NON PFC Version |
| | **Output** | **Output power** | 90W |
| | | **DC output** | 19.0V |
| | | **Hold-up time** | 5 msec at 115 VAC input |
| | | **Output current limit** | <11A, Over voltage protection- 29V max automatic shutdown |
| | **Connector** | 3 pin/grounded, mates with interchangeable cords | |
| | **Environmental Design** | **Operating temperature** | 32° to 104° F (0° to 40° C) |
| | | **Non-operating (storage) temperature** | -4° to 149° F (-20° to 65° C) |
| | | **Altitude** | 0 to 10,000 ft (0 to 3,048 m) |
| | | **Humidity** | 20% to 80% |
| | | **Storage Humidity** | 10% to 90% |
| | **EMI and Safety Certifications** | CE Mark - full compliance with LVD and EMC directives; Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE; MTBF- over 200,000 hours at 25°C ambient condition. | |

| | | | |
|---|---|---|---|
| **HP 65W Smart AC Adapter (Configurations with integrated graphics)** | **Dimensions** | 4.17 x 1.85 x 1.1 in (10.6 x 4.7 x 2.8 cm) | |
| | **Weight** | 0.62 lb (280 g) | |
| | **Input** | 100 to 240 VAC | |
| | | **Input Efficiency** | 87% min at 115 VAC |
| | | **Input frequency range** | 47 to 63 Hz |
| | | **Input AC current** | 1.7 A at 90 VAC, 0.85 A at 180 VAC |
| | **Output** | **Output power** | 65W |
| | | **DC output** | 18.5V |
| | | **Hold-up time** | 5 msec at 115 VAC input |
| | | **Output current limit** | <11A, Over voltage protection- 29V max automatic shutdown |
| | **Connector** | 3 pin/grounded, mates with interchangeable cords | |
| | **Environmental Design** | **Operating temperature** | 32° to 104° F (0° to 40° C) |
| | | **Non-operating (storage) temperature** | -4° to 149° F (-20° to 65° C) |

| | | | |
|---|---|---|---|
| | | **Altitude** | 0 to 10,000 ft (0 to 3,048 m) |
| | | **Humidity** | 20% to 80% |
| | | **Storage Humidity** | 10% to 90% |
| | **EMI and Safety Certifications** | CE Mark - full compliance with LVD and EMC directives; Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE; MTBF - over 200,000 hours at 25°C ambient condition. | |

| | | | |
|---|---|---|---|
| **6-Cell (51 WHr) Lithium-Ion battery** | **Dimensions** (H x W x L) | 0.8 x 1.99 x 8.11 (2.03 x 5.06 x 20.6cm) | |
| | **Weight** (max) | .70lb, (.312kg) | |
| | **Cells/Type** | 6-cell Lithium-Ion | |
| | **Energy** | **Voltage** | 10.8V |
| | | **Amp-hour capacity** | 4.4Ah |
| | | **Watt-hour capacity** | 51Wh |
| | **Temperature** | **Operating (Charging)** | 32° to 113° F (0° to 45° C) |
| | | **Operating (Discharging)** | 14° to 122° F(-10° to 50° C) |
| | | **Non-operating** | -4° to 122° F (-20° to 50° C) |
| | **Battery Re-Charge Time** | **System in OFF or Standby Mode** | 2.5 hours |
| | | **System ON** | 3 to 5 hours |
| | **Fuel Gauge LED** | No | |
| | **Warranty** | 1 year | |
| | **Compatible with optional Travel Battery** | No | |

## ENVIRONMENTAL

**Environmental Data**

**Eco-Label Certifications**

This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks:

US ENERGY STAR
IT ECO declaration
EPEAT Gold with a Microsoft OS where HP registers commercial notebook products. See http://www.epeat.net for registration status in your country.

**System Configuration**

The configuration used for the Energy Consumption and Declared Noise Emissions data is based on a "Typically Configured Notebook"

| **Energy Consumption** | 115 VAC | 230 VAC | 100 VAC |
|---|---|---|---|
| Normal Operation | 5.84 W | 7.34 W | 6.59 W |
| Sleep (Energy Star low power mode) | 0.94 W | 1.09 W | 0.94 W |
| Off | 0.51 W | 0.63 W | 0.50 W |

| **Heat Dissipation*** | 115 VAC | 230 VAC | 100 VAC |
|---|---|---|---|
| Normal Operation | 20 BTU/hr | 25 BTU/hr | 22 BTU/hr |
| Sleep | 3 BTU/hr | 4 BTU/hr | 3 BTU/hr |
| Off | 2 BTU/hr | 2 BTU/hr | 2 BTU/hr |

* Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.

**Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)**

| System Fan Off | Sound Power (LWAd, bels) | Sound Pressure (LpAm, decibels) |
|---|---|---|
| Idle | 3.6 | 28 |
| Fixed Disk (random writes) | 3.6 | 28 |

System fan is usually off except when charging the battery

**Batteries**

This battery(s) in this product comply with EU Directive 2006/66/EC

Batteries used in the product do not contain:

- Mercury greater the 5ppm by weight
- Cadmium greater than 10ppm by weight

The battery type and chemistry used in the product is:

CR2032 (coin cell), Li-ion
6-cell high capacity Lithium-Ion battery (optional 8 cell available)

**Additional information**

This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2002/95/EC.

This HP product is designed to comply with the Waste Electrical and Electronic

Equipment (WEEE) Directive - 2002/96/EC.

This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).

This product is in compliance with the IEEE 1680 (EPEAT) standard at the Gold level, see www.epeat.net

Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.

This product contains 0% post-consumer recycled plastic (by wt.)

This product is greater than 95.91% recycle-able when properly disposed of at end of life.

Packaging Materials

- External:
  - PAPER/Cardboard & misc 320 g
  - PAPER/Corrugated 51 g
- Internal:
  - PLASTIC/Polyethylene low density 12 g
  - PLASTIC/EPE-Expanded Polyethylene 68 g
  - PLASTIC/PET 20 g
  - OTHER/OTHER 20 g
- The PAPER/Cardboard & misc is made from 80% recycled content.
- The PAPER/Corrugated is made from 80% recycled content.
- The PLASTIC/Polyethylene low density is made from 65% recycled content
- The PLASTIC/EPE-Expanded Polyethylene is made from 65% recycled content
- The PLASTIC/PET is made from 65% recycled content
- The OTHER/OTHER is made from 65% recycled content

HP follows these guidelines to decrease the environmental impact of product packaging:

- Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials.
- Eliminate the use of ozone-depleting substances (ODS) in packaging materials.
- Design packaging materials for ease of disassembly.
- Maximize the use of post-consumer recycled content materials in packaging materials.
- Use readily recyclable packaging materials such as paper and corrugated materials.
- Reduce size and weight of packages to improve transportation fuel efficiency.
- Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.

## MATERIAL USAGE

This product does not contain any of the following substances in excess of regulatory limits (for reference of these limits please refer to the HP General Specification of the Environment (http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html):

- Asbestos
- Certain Azo Colorants
- Certain Brominated Flame Retardants – may not be used as flame retardants in plastics
- Cadmium
- Chlorinated Hydrocarbons
- Chlorinated Paraffins
- Formaldehyde
- Halogenated Diphenyl Methanes
- Lead carbonates and sulfates
- Lead and Lead compounds
- Mercuric Oxide Batteries
- Ozone Depleting Substances
- Polybrominated Biphenyls (PBBs)
- Polybrominated Biphenyl Ethers (PBBEs)
- Polybrominated Biphenyl Oxides (PBBOs)
- Polychlorinated Biphenyl (PCB)
- Polychlorinated Terphenyls (PCT)
- Polyvinyl Chloride (PVC) – except for wires and cables, and certain retail packaging has been voluntarily removed from most applications.
- Radioactive Substances
- Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)
- Nickel finishes that release greater than 0.5 µgrams/$cm^2$/week, measured according to EN 1811:1998, are not used on any product surface designed to be frequently handled or touched by users.

## END-OF-LIFE MANAGEMENT AND RECYCLING

Hewlett-Packard offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: http://www.hp.com/go/reuse-recycle or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.

The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/recyclers. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

## HEWLETT-PACKARD CORPORATE ENVIRONMENTAL INFORMATION

For more information about HP's commitment to the environment:

Global Citizenship Report
http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html
Environment website
http://www.hp.com/environment
Eco-label certifications

## Technical Specifications

http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html
ISO 14001 certificates:
http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html

Options and Accessories (sold separately and availability may vary by country)

| Type | Description | Part # |
|---|---|---|
| **Memory** | HP 2 GB (DDR3 1333 MHz) SODIMM | AT912AA#xxx |
| | HP 4 GB (DDR3 1333 MHz) SODIMM | AT913AA#xxx |
| | HP 2 GB PC3-12800 (DDR3 1600 MHz) SODIMM | H2P63AA#xxx |
| | HP 4 GB PC3-12800 (DDR3 1600 MHz) SODIMM | H2P64AA#xxx |
| | **NOTE:** Full availability of 4 GB or more of memory requires Windows Vista Business 64-bit or Linux. With Windows 32-bit operating systems, the amount of usable memory is dependent upon your configuration, so that above 3 GB all memory may not be available due to system resource requirements. | |
| **Cases** | HP Essential Top Load Case | H2W17AA |
| | HP Essential Backpack | H1D24AA |
| | HP Essential Messenger Case | H1D25AA |
| **Docking** | HP Dual Hinge Notebook Stand | AW661AA |
| | HP Display and Notebook Stand | AW662AA |
| | HP 3005pr USB 3.0 Port Replicator | H1L08AA |
| | HP 2005pr USB 2.0 Port Replicator | H1L07AA |
| **Input/Output - Mice** | HP 2.4 GHz Wireless Optical Mobile Mouse | LX732AA |
| | HP Wireless Mobile Mouse | H2L63AA |
| | HP USB Essential Keyboard/Mouse | H2S75AA |
| **Adapters** | HP 90W Slim Adapter | BT796AA |
| | HP 90W Smart AC/Auto/Air Combo Adapter | ED493AA |
| **Storage - External Storage** | HP Mobile USB DVDRW | A2U57AA |
| **Batteries** | HP PR06XL Long Life Notebook Battery | QK646AA |
| **Health and Education** | HP 20-Notebook Managed Charging Cart | QL489AA |
| | HP 20-Notebook Charging Cart | QL488AA |
| | HP 30-Notebook Managed Charging Cart | QL490AA |
| | HP Pocket Whiteboard | A0X37AA |

## Options and Accessories (sold separately and availability may vary by country)

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